Anacostia Wetlands: Has RECONSTRUCTION led to RESTORATION?

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Reconstructed Freshwater Tidal Wetlands in the Anacostia

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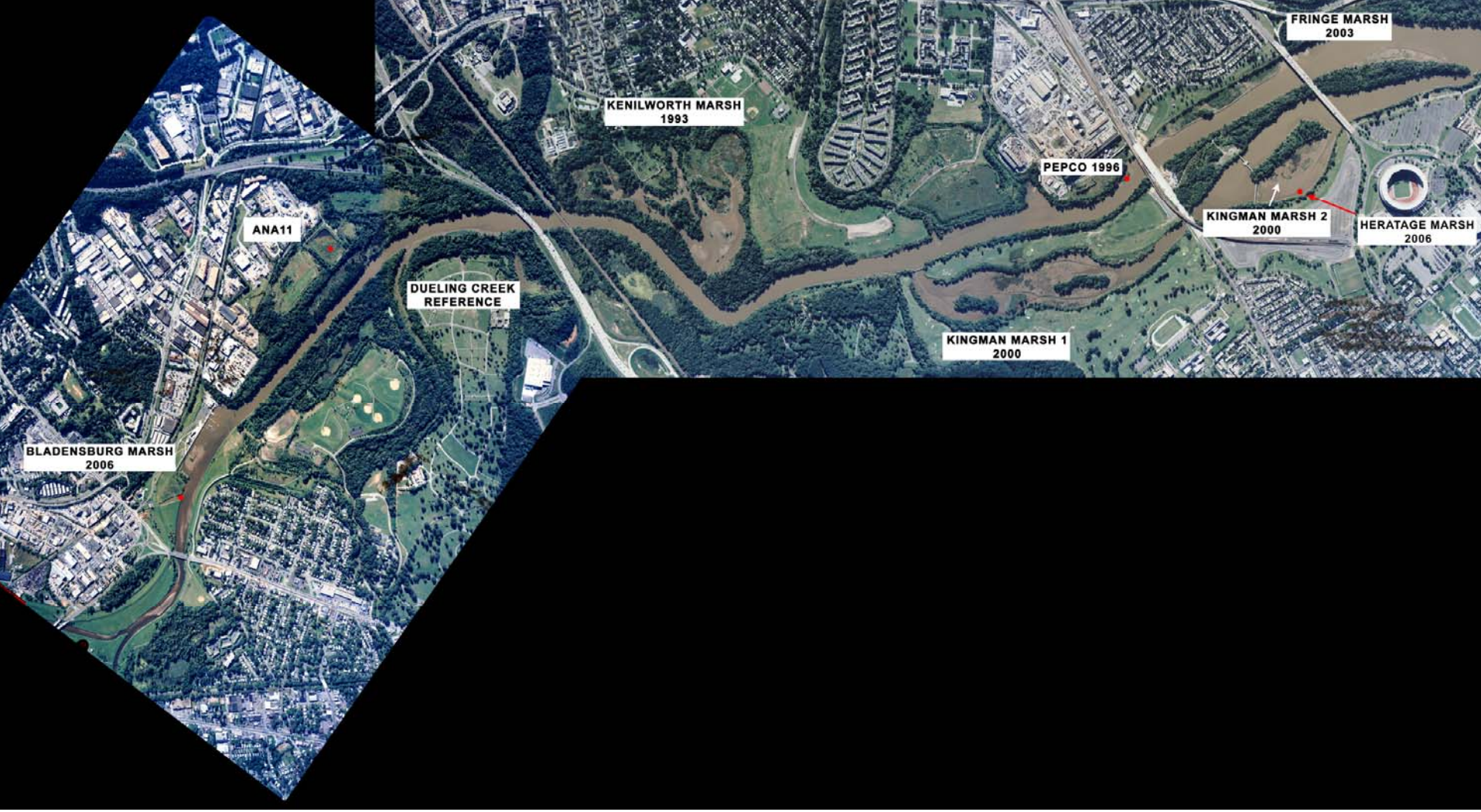
Reconstructed Wetlands of the Tidal Anacostia

Site	Acres	Date reconstructed
1. Kenilworth Marsh	31	1993
2. Benning Power Plant	0.5	1996
3. Kingman Marsh	40	2000
4. Fringe Marsh	16	2003
5. Heritage Marsh	5	2006
6. Bladensburg Marsh	1	2006
7. Anacostia 11	21	2007

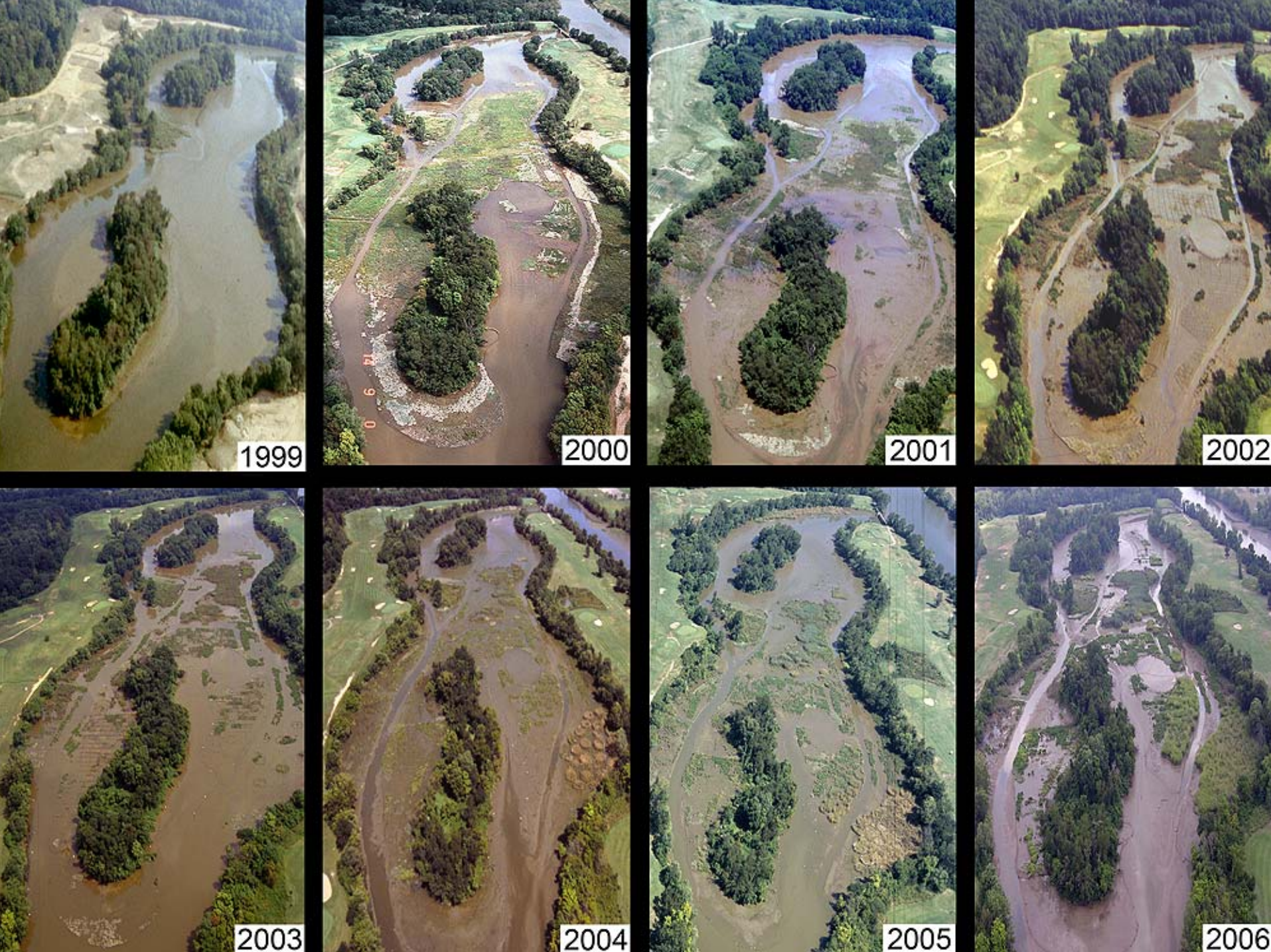


- RECONSTRUCTED ANACOSTIA WETLANDS

2006

Un-dredged 1927 Dredged

- Photo mosaic of Anacostia study wetlands with dates of reconstruction and acreages


1999
2000
2001
2002
2003
2004
2005
2006


1998


2003


2000


2004


2001


2005


2002


2006

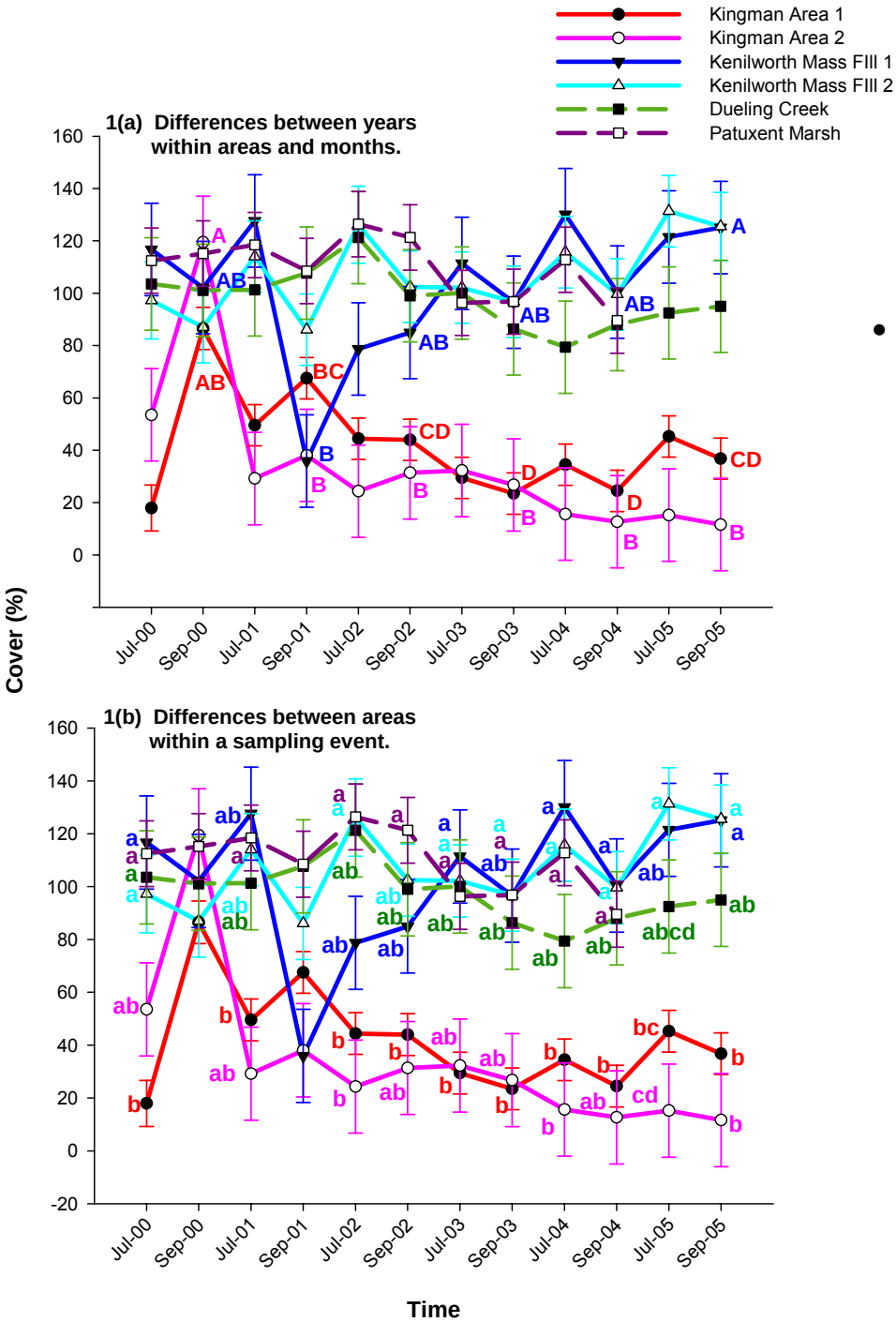

2000


2006


08:08:2003 10:47

CONCLUSIONS

1. Vegetation parameters such as cover, richness, diversity, presence of annuals/perennials, etc. were useful for tracking the marsh restoration process and progress. In so doing they could expose such influencing factors as goose herbivory, invasive plant interactions and low sediment elevations.



- **Figure 1.** Total vegetative cover. Data points represent least squares means ± SE. Labels are based on Tukey test results (family-wise error rate α = 0.05). Within areas (Fig. 1a), monthly means sharing the same upper-case letters are not significantly different from year to year within the same month. Within a sampling event (Fig. 1b), means sharing the same lower-case letters are not significantly different. Unlabeled series have no significant differences. Reading of the University of Maryland transects at Patuxent Marsh was discontinued after 2004.

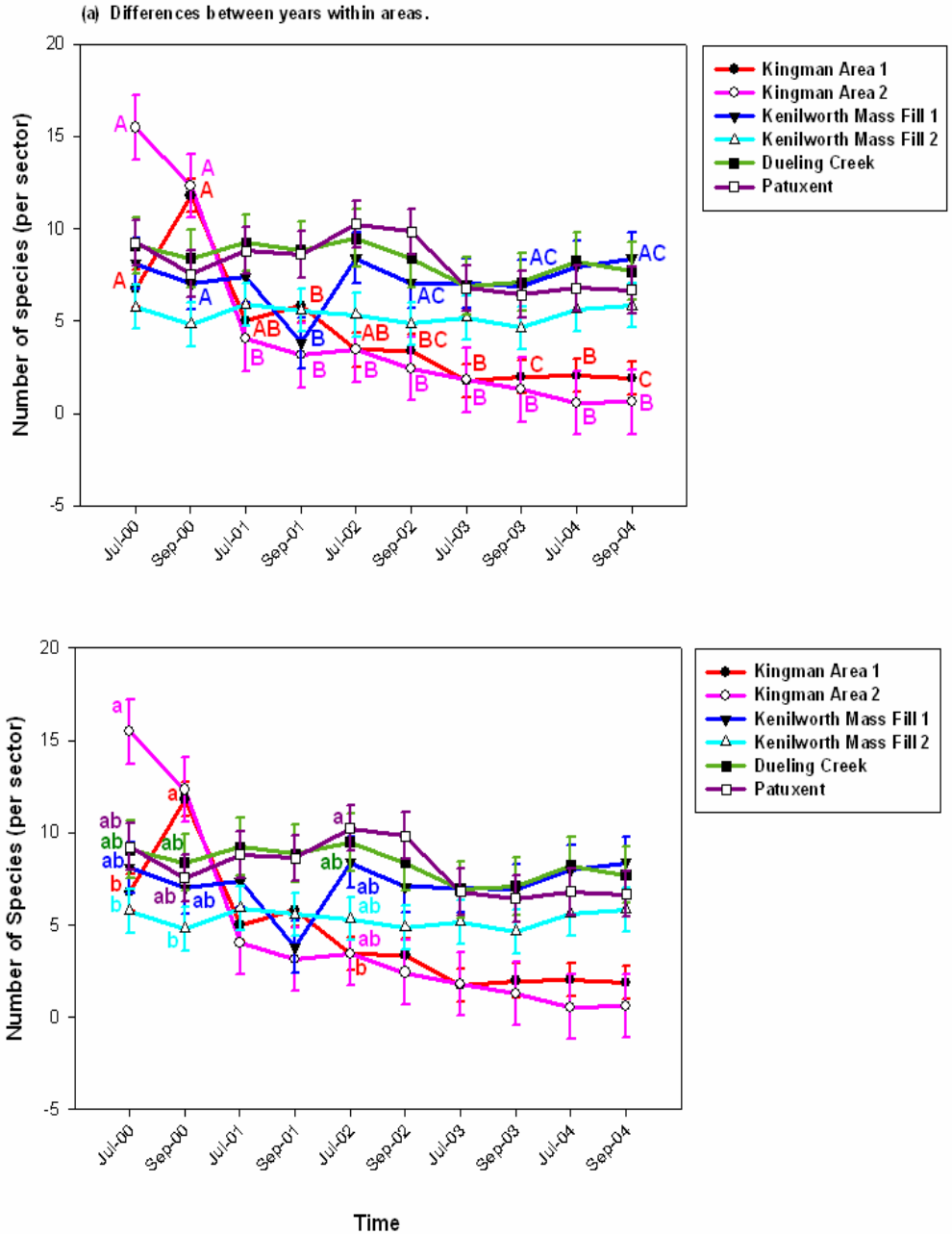


Figure 3. Species richness of areas over time.

Data points represent least square means ± 1SE. Labels are based on Tukey test results (overall $\alpha = 0.05$). Within areas (Fig. 3a), means sharing the same upper-case letters are not significantly different from year to year. Within a sampling event (Fig. 3b), means sharing the same lower-case letters are not significantly different. Unlabeled series have no significant differences.

2. As measured by laser level there was a significant elevation loss (about 2 inches) at Kingman Area 1 from 2001-2004 and a considerable elevation loss at Kingman Area 2 (1.5”) for the same time frame.

	Transect #	Elevation 2001	Elevation 2004	Sediment Elevation Change	
Kingman Area 1		**feet**	**feet**	**Feet**	**Cm**
planted	1	1.51	1.11	-0.40	-12.2
	2	1.37	1.15	-0.22	- 6.7
	3	1.53	1.53	0.00	-0.0
	4	1.93	1.73	-0.20	-6.1
	5	1.89	1.67	-0.22	-6.7
	6	2.18	2.04	-0.14	-4.3
	7	1.86	1.68	-0.18	-5.5
	8	1.82	1.76	-0.06	-1.8
	9	1.57	1.47	-0.10	-3.1
	10	2.02	2.05	+0.03	+0.9
	11	1.82	1.66	-0.16	-4.9
unplanted	1	2.25	2.14	-0.11	-3.4
	2	2.16	1.88	-0.28	-8.5
	3	1.53	1.40	-0.13	-4.0
Kingman area 2					
planted	1	1.97	1.80	-0.17	-5.2
	2	1.87	1.87	0.00	-0.0
	3	1.64	1.48	-0.16	-4.9

3. Longer periods of inundation at lower elevations reduced the ability of vegetation to rebound from grazing as seedling germination was reduced and plant growth slowed.

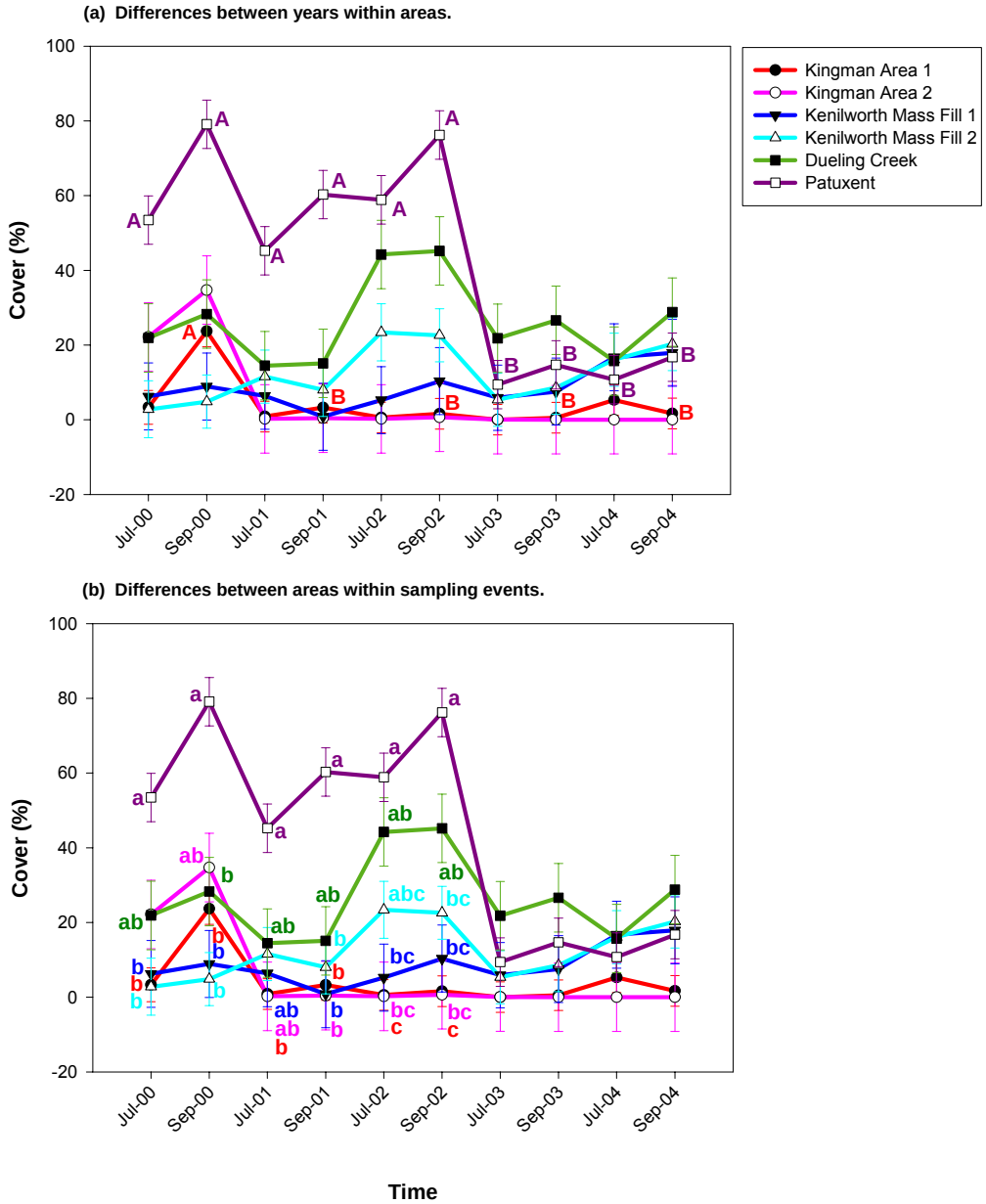


Figure 11. Cover by annuals over time.
Data points represent least square means ± 1SE. Labels are based on Tukey test results (overall α = 0.05). Within areas (Fig. 11a), means sharing the same upper-case letters are not significantly different from year to year. Within a sampling event (Fig. 11b), means sharing the same lower-case letters are not significantly different. Unlabeled series had no significant differences.

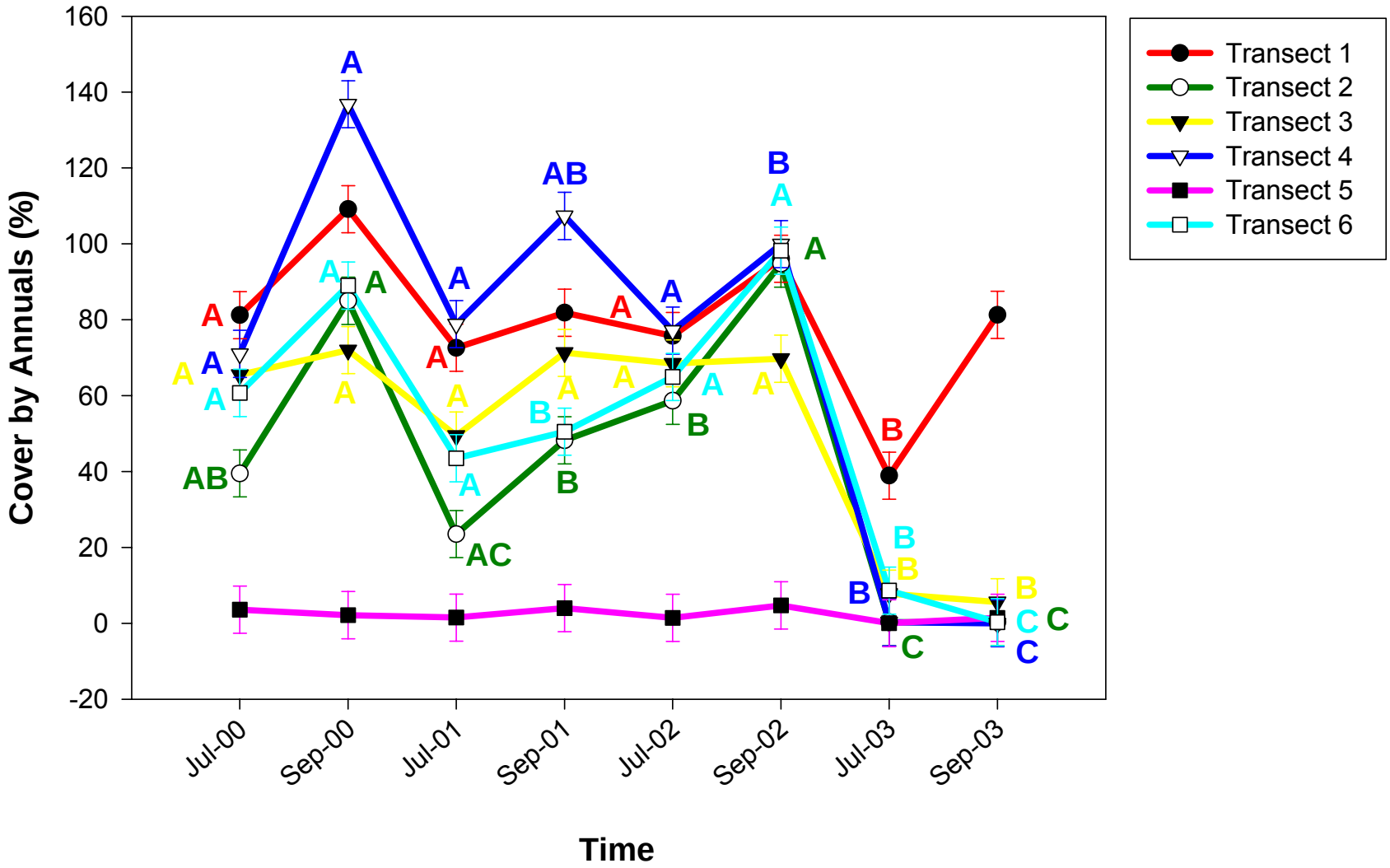
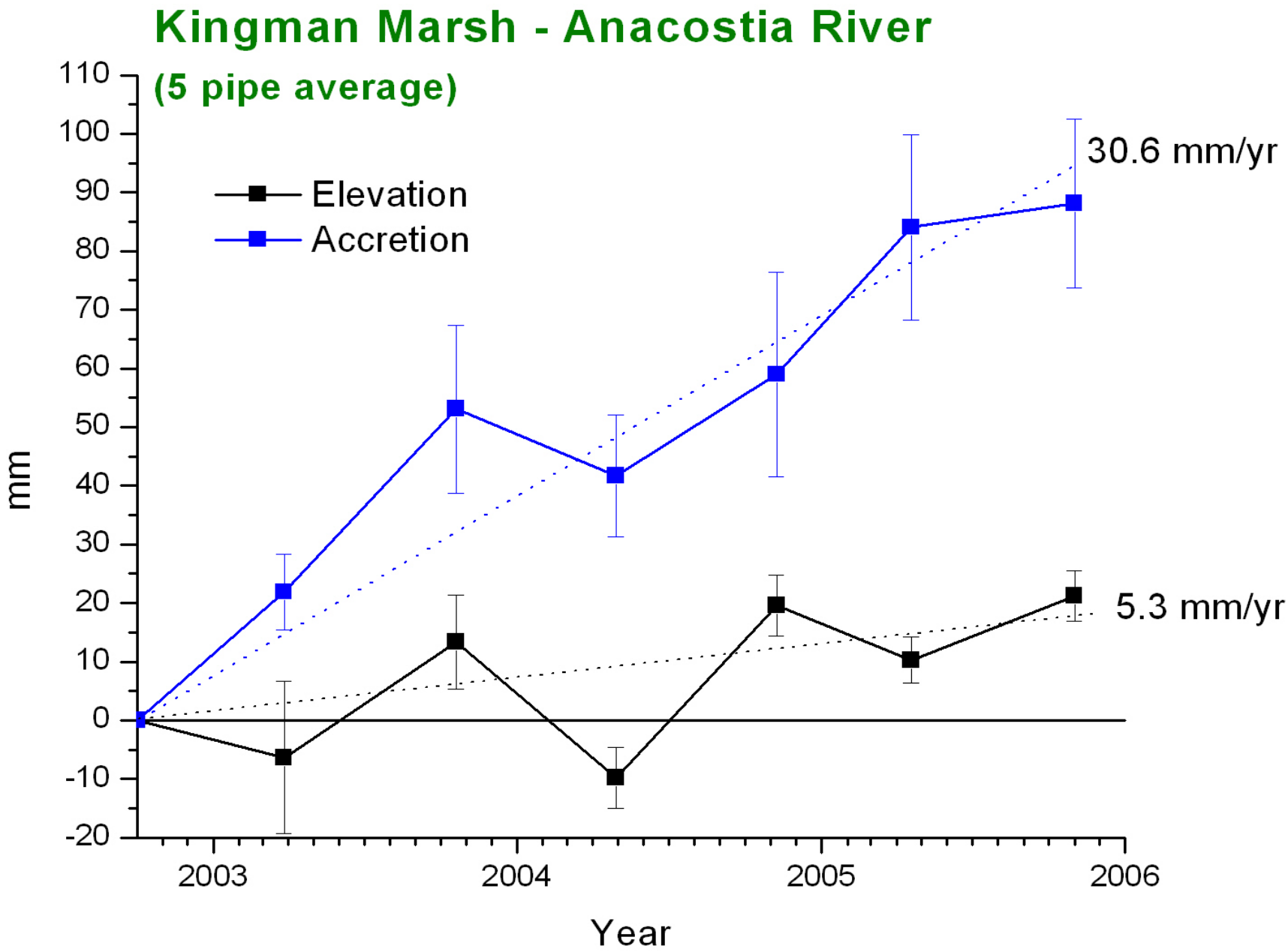


Figure 7. Cover by annuals at Patuxent over time.
Data points represent least square means ± 1SE. Labels are based on Tukey test results (overall α = 0.05). Within transects, means sharing the same upper-case letters are not significantly different from year to year. Transects lacking labels had no significant year-to-year differences.

4. Data from Surface Elevation Tables (SETs) at Kingman and Kenilworth Marshes documented ongoing vertical accretion in areas not subject to erosion, but no net change in elevation revealed subsidence is still occurring.


Kingman Marsh - Anacostia River
(5 pipe average)
Elevation
Accretion
30.6 mm/yr
5.3 mm/yr
mm
Year
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
2003
2004
2005
2006

5. Data from hydrologgers revealed higher than normal water levels from greater than normal rainfall in 2003 and 2004 which further hindered revegetation processes by extending periods of inundation.

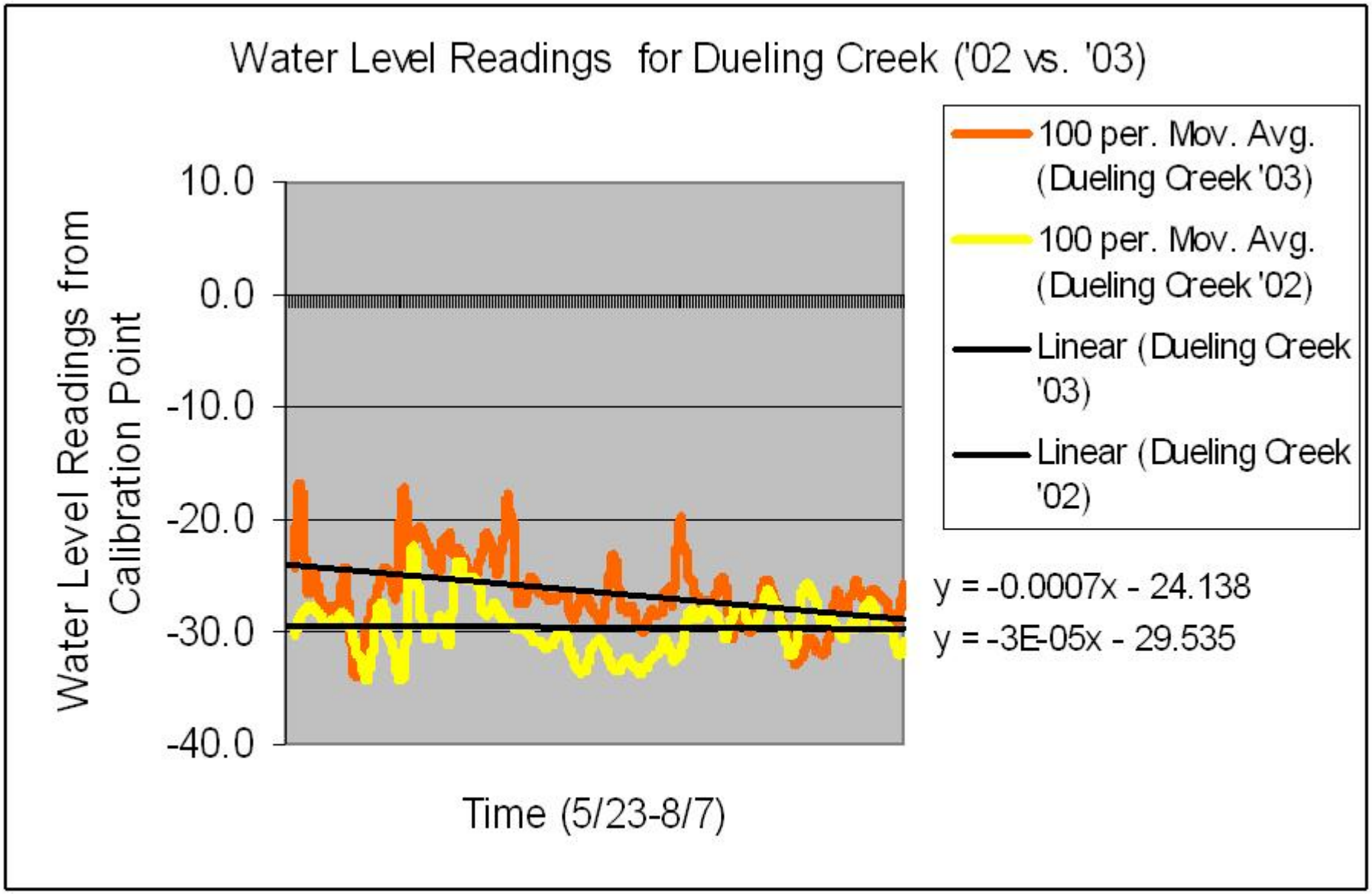


Figure 17. Water levels at Dueling Creek Marsh for the period 5/23-8/7 for 2003 (a wet year) averaged 2-5" higher than for the same period in 2002 (a dry year).

6. Observations from exclosures placed at various elevations revealed the potential for revegetation where grazing was averted and where elevations were suitable to support vegetation growth.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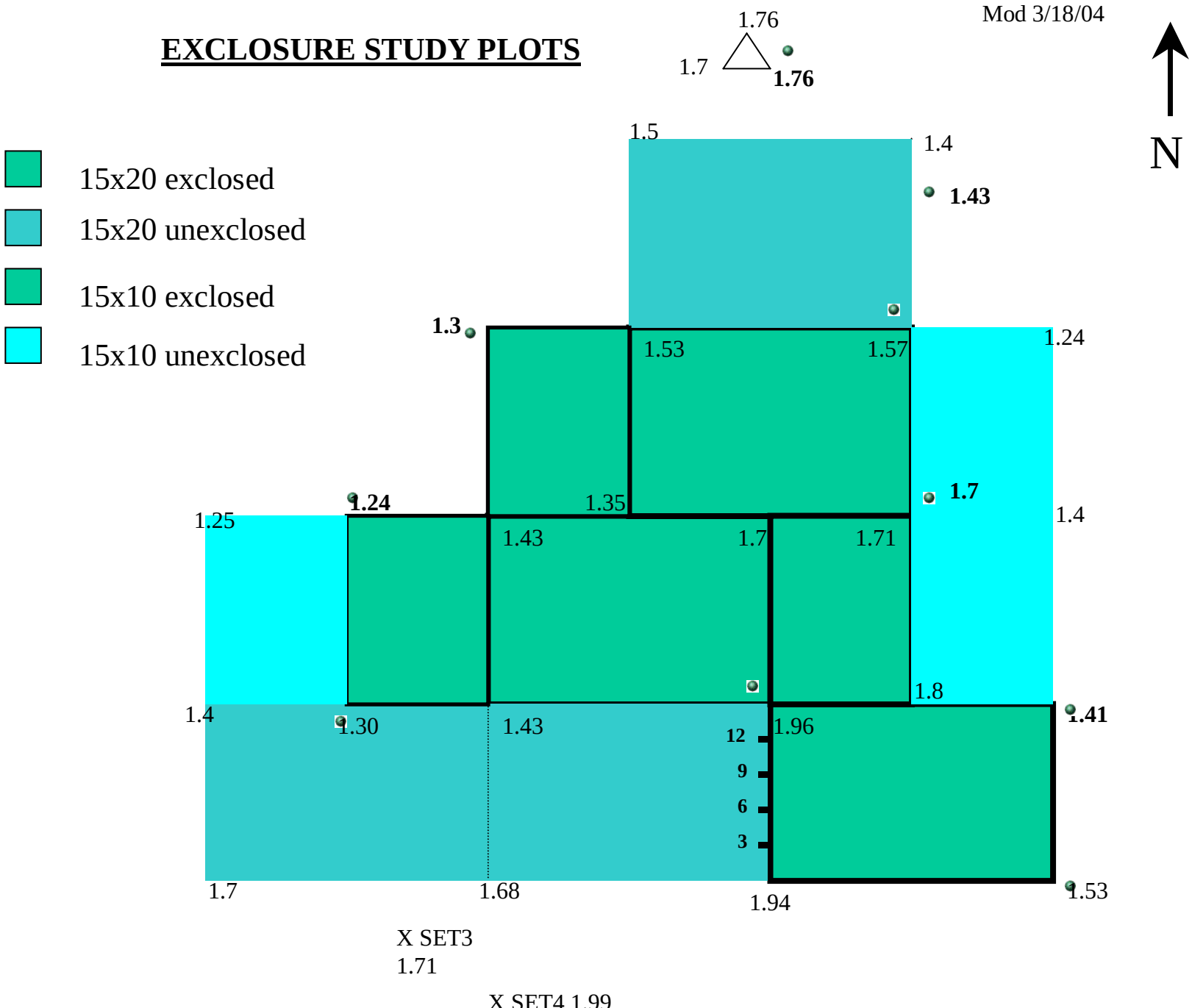
EXCLOSURE STUDY PLOTS

Mod 3/18/04



7. There was ample seed dispersal and seed bank available such that conditions of weak vegetative regeneration could not be attributed to these factors.

8. At Kingman Marsh, planted species did not contribute importantly to the reconstructed marsh over time.

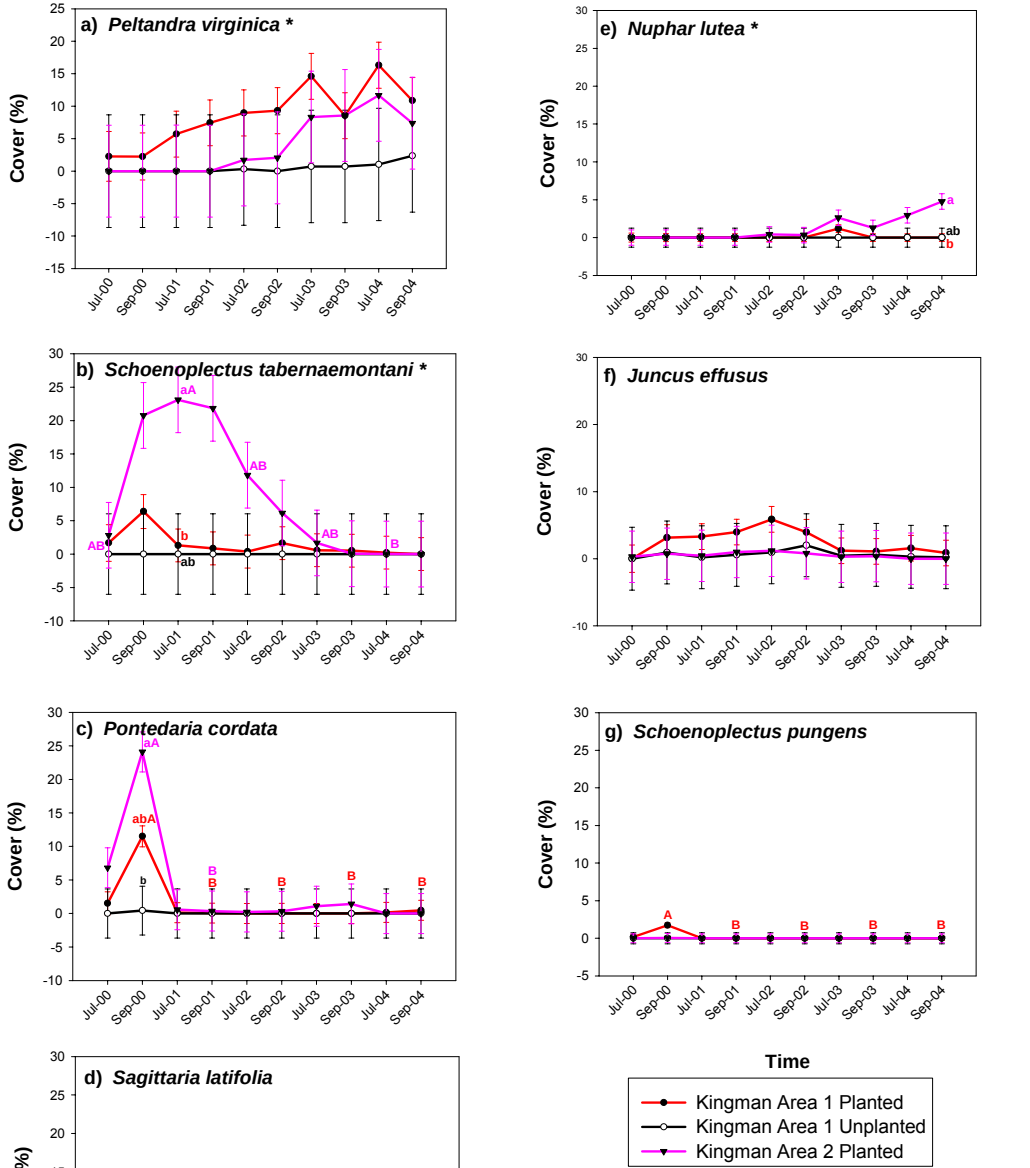


Figure 10. Cover by species planted and replanted* at Kingman.

Data points represent least square means ± 1SE. Labels are based on Tukey test results (overall $\alpha = 0.05$). Within areas, means sharing the same upper-case letters are not significantly different from year to year. Within a sampling event, means sharing the same lower-case letters are not significantly different. Unlabeled series have no significant differences.

Conclusions for Kingman Marsh

- Large functional seed bank
- Vegetation tracked processes
- Emergent vegetation including planted vegetation greatly reduced;

  Planted species provide limited cover
- High water levels and sediment loss reduce revegetation
- Sedimentation as well as erosion is occurring; also subsidence. No net elevation change overall
- Marsh impacted from over-abundant geese coupled with lowered elevations;
- Exclosures reveal marsh potential
- Need for some form of resident Canada goose management; EA being written

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2006.08.17